

Abstract

A processing chamber having an improved sealing means is disclosed. The processing chamber comprises a lower element, an upper element, and a seal energizer. The seal energizer is configured to maintain the upper element against the lower element to maintain a processing volume. The seal energizer is further configured to generate a sealing pressure in a seal-energizing cavity that varies non-linearly with a processing pressure generated within the processing volume. In one embodiment, the seal energizer is configured to minimize a non-negative net force against one of the upper element and the lower element above a threshold value. The net force follows the equation  $P1 \cdot A1 - P2 \cdot A2$ , where P1 equals the sealing pressure, P2 equals the processing pressure, A1 equals a cross-sectional area of the seal-energizing cavity, and A2 equals a cross-sectional area of the processing volume.